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(54) A PULLING APPARATUS FOR CONTINUOUSLY PULLING  
 METAL WIRES, BARS OR TUBES THROUGH COLD  
 DRAWING, PEELING AND GRINDING STATIONS

(71) I, LUIGI DANIELI, trading as OFFICINE MECCANICHE DANIELI, of Italian Nationality, and of 33042 Buttrio (Udine), Italy, do hereby declare the invention, for 5 which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a pulling apparatus for continuously pulling a workpiece 10 in the form of a metal wire, bar or tube through cold drawing, peeling and grinding stations.

According to the present invention there 15 is provided a pulling apparatus for continuously pulling a workpiece in the form of a metal wire, bar or tube through cold drawing, peeling and grinding stations, the apparatus comprising two superposed endless 20 tracks having two substantially parallel lengths arranged to be driven in the same direction, the tracks each having a plurality of clamps for clamping the workpiece, the clamps having grooves which cooperate 25 along said parallel lengths to grip the workpiece and each clamp being mounted on its respective track through resilient damper means, the tracks being movable with respect to means for pressing the clamps in 30 one of said parallel lengths towards those in the other parallel length to cause the workpiece to be gripped by the grooves, the clamps being urged towards one another by further means in the form of fluid operated piston-and-cylinder means and the 35 damper means comprising layers of resilient material interposed between the clamps and the tracks.

For a better understanding of the invention reference will now be made by way of 40 example to the accompanying drawings in which:

Figure 1 is a schematic side elevational view showing two superposed endless tracks 45 of apparatus according to the invention, a

workpiece, being shown between clamps of the tracks;

Figure 2 is an enlarged cross-sectional view of a detail of the apparatus;

Figure 3 is an enlarged elevational view 50 illustrating a modification of the detail shown in Figure 2; and

Figure 4 is an enlarged partial cross-sectional view taken along the lines X-X 55 of Figure 2.

As shown in Figure 1, the apparatus comprises two superposed endless tracks 10 and 10' formed of chain links 11 and 11' respectively, each track meshing with a pair of chain wheels 13 and 13' respectively, carried 60 by shafts 14 and 14' respectively. The tracks rotate in opposite directions, as indicated by arrows A in Figure 1, as the chain wheels are driven by said shafts 14 and 14', so that substantially parallel superimposed 65 reaches of the tracks move in the same direction as indicated by arrow B, this being the traction direction of a workpiece in the form of a metal wire, bar or tube 15 to be pulled by the apparatus. 70

Each link 11 and 11' has tabs 16 supporting a carriage comprising steel plates 17 and 18 from which four rollers 28 project laterally as shown in Figure 2. A resilient layer 19 e.g. of rubber or synthetic 75 material is, as shown in Figure 4, provided between the plate 18 and a further plate 26 having a dovetail rib to which is detachably keyed a clamp 20 or 20' as the case may be, the layer 19 serving as a damper for 80 the clamp which acts directly upon the workpiece 15. The clamp is positioned on the plate 26 by a pin 27. The clamps 20 and 20' of the tracks 10 and 10', respectively have cooperating grooves 22 dimensioned in accordance with the workpieces to 85 be processed, each clamp having a plurality of different grooves to accommodate workpieces of different gauge and profile. The clamps 20 and 20' are urged towards 90

one another by hydraulic piston-and-cylinder means 23, through pressing means in the form of ground rectilinear races 24 acting upon the rollers 28, and upon which these rollers run. The pressure exerted by the piston-and-cylinder means 23 is adjustable in accordance with the pull to be exerted on the workpiece 15.

As the tracks 10 and 10' rotate in the directions of the arrows A, respectively, the workpiece 15, captured by the clamps 20 and 20', is advanced in the direction of the arrow B and undergoes drawing, peeling and grinding operations.

As will be apparent from Figure 1, the rollers 28 of the carriages run on the races 24 which are moved towards one another by the piston-and-cylinder means 23 to cause the clamps 20 and 20' to grip the workpiece 15. The workpiece 15 is thus pressed between the clamps 20 and 20' with a predetermined pressure so that slippage is avoided.

The grooves 22 may be shaped to accommodate workpieces of circular or other cross-section.

According to the modification of Figure 3, the carriages have no rollers but the races 24 are replaced by races in the form of plates 25 carrying rollers which are pressed against the carriages by the action of the piston-and-cylinder means 23 to cause the clamps 20 and 20' to grip the workpiece.

#### WHAT I CLAIM IS:—

1. A pulling apparatus for continuously pulling a workpiece in the form of a metal wire, bar or tube through cold drawing, peeling and grinding stations, the apparatus comprising two superposed endless tracks having two substantially parallel lengths arranged to be driven in the same direction, the tracks each having a plurality of clamps for clamping the workpiece, the clamps having grooves which cooperate along said parallel lengths to grip the workpiece and each clamp being mounted on its respective track through resilient damper means, the tracks being movable with respect to means for pressing the clamps in one of said parallel lengths towards those in the other parallel length to cause the workpiece to be

gripped by the grooves, the clamps being urged towards one another by further means in the form of fluid operated piston-and-cylinder means and the damper means comprising layers of resilient material interposed between the clamps and the tracks.

2. Apparatus as claimed in Claim 1, in which the tracks comprise carriages each provided with pairs of rollers which run on said pressing means which are in the form of races.

3. Apparatus as claimed in Claim 1, in which the tracks comprise a series of blocks and the pressing means are in the form of plates supporting rollers which cooperate with such blocks.

4. Apparatus as claimed in Claim 1, 2 or 3, in which each clamp has a plurality of grooves.

5. Apparatus as claimed in Claim 1, in which the piston-and-cylinder means act directly on the pressing means.

6. Apparatus as claimed in any one of the preceding claims, in which the clamps are secured to the tracks by means of mating dovetail members.

7. Apparatus as claimed in Claim 6, in which the clamps are detachably secured to the dovetail members, and are positioned thereon, by means of pins.

8. Apparatus as claimed in any one of the preceding claims, in which the resilient damper means comprise rubber layers.

9. A pulling apparatus for continuously pulling a workpiece in the form of a metal wire, bar or tube through cold drawing, peeling and grinding stations, substantially as hereinbefore described with reference to Figures 1, 2 and 4 of the accompanying drawings or being modified substantially as hereinbefore described with reference to Figure 3 of the accompanying drawings.

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This drawing is a reproduction of  
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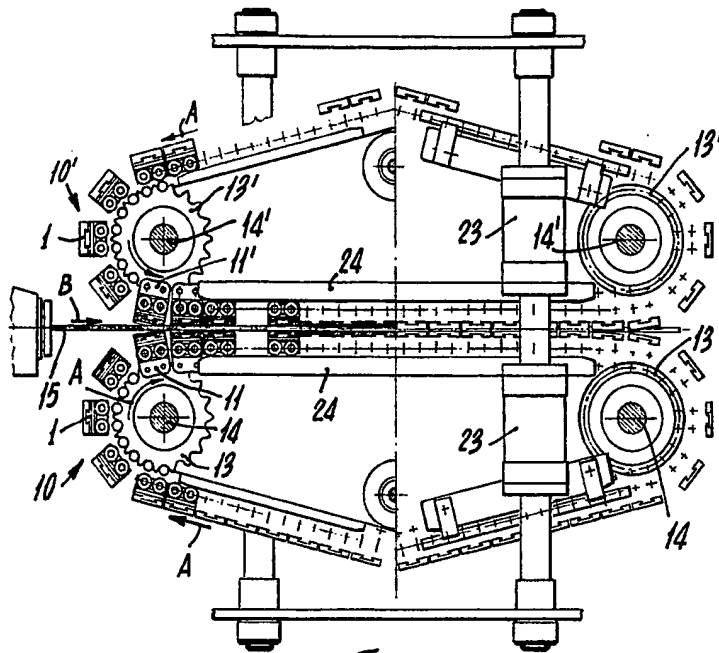


FIG. 1

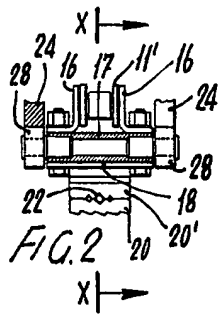


FIG. 2

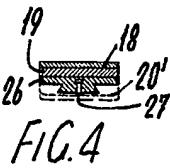


FIG. 4

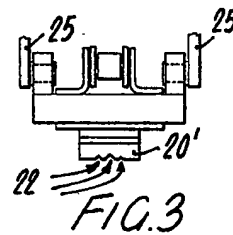


FIG. 3